PIECES TO A PUZZLE: A LITHIC REFIT STUDY EVALUATING STRATIGRAPHIC AND LITHIC COMPONENTS OF THE OWL RIDGE SITE, CENTRAL ALASKA

An Undergraduate Research Scholars Thesis

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JUDITH ANNE COURTNEY MELTON

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TABLE OF CONTENTS

ABSTRACT

Pieces to a Puzzle: A Lithic Refit Study Evaluating Stratigraphic and
Lithic Components of the Owl Ridge Site, Central Alaska. (May 2015)

Judith Anne Courtney Melton
Department of Anthropology
Department of International Studies
Texas A&M University

Research Advisor: Dr. Kelly E. Graf
Department of Anthropology

Ice Age archaeology in Alaska is important for understanding when and how people first inhabited the Bering Land Bridge and ultimately peopled the Americas during a period of global climate change. The Owl Ridge archaeological site, located in the Teklanika valley of central Alaska, provides an intriguing look into prehistoric human life at the end of the Ice Age in this remote northern context. Containing three seemingly discrete components, Owl Ridge holds a plethora of lithic material which may shed light on this time period to help explain how Ice Age humans settled central Alaska. Lithic refit and technological analyses were conducted on available artifacts from the Owl Ridge site, verifying the presence of three separate occupation layers, one comprised of the Nenana complex and the other two of the Denali complex. Also from these data, lithic reduction patterns were identified, potentially illuminating lithic tool use at the site. Furthermore, overall site integrity was evaluated, by combining refits and technological data collected by this study.

DEDICATION

I dedicate this to my mom. Without her never-ending enthusiasm, support, and guidance, this may have been a much bumpier ride.

ACKNOWLEDGEMENTS

I would like to thank my research advisor, Dr. Kelly Graf for her unending patience, support, and enthusiasm while working on this project.

CHAPTER I

INTRODUCTION

Introduction

The peopling of the New World is hotly debated by American archaeologists. Where, when, and how this event took place are all questions yet to be adequately answered. At the forefront of this debate is Beringia, arguably the most accepted route through which prehistoric peoples dispersed into North America (Raghavan et al. 2014; Rasmussen et al. 2014; Yesner 2001). By at least 14,500 calendar years before present (cal BP), people crossed the now-submerged Beringian land mass connecting modern day Alaska and Siberia, a step that initiated the populating of the entire hemisphere (Hoffecker et al. 1993; Holmes 2011). Yet, following this initial arrival, little is known about the activities and behaviors that allowed humans to settle into prehistoric, terminal Pleistocene Alaska. Recent excavations and research at one site in central Alaska, Owl Ridge, are assisting us in resolving questions of how eastern Beringia was settled during the terminal Pleistocene (Gore and Graf 2015; Graf and Bigelow 2011). The current project focuses on site formation at Owl Ridge. Specifically, I use an artifact-refit study coupled with the site's radiocarbon chronology to address the questions of (1) component integrity, (2) how many times people occupied the site between 13,100 and 10,800 cal BP, and (3) what types of technological activities they were conducting during these occupation events. Through detailed analyses of archaeological sites from Alaska and Siberia, such as with this project, we can explain where, when, and how the Americas were peopled. The remainder of this chapter provides discussion of the late Pleistocene setting in central Alaska, background to the site of Owl Ridge and project objectives.

Late Pleistocene Alaska

Today, the region called Beringia includes the vast territory from the Kolyma river drainage in far northeastern Siberia east to the Mackenzie river drainage in northwestern Canada, including all of Alaska (Hopkins et al. 1981). During the Pleistocene, however, sea levels were quite low (at least 200 m below sea level) and a great landmass, the Bering Land Bridge, connected Northeast Asia with North America and was available for humans to traverse. In Alaska, researchers hope to find answers to questions of when and from where humans dispersed to the Americas and how they began to settle a North American landscape. Both archaeological and genetic evidence is beginning to show who and how people first arrived in Alaska between 15,000 and 14,000 cal BP (Hoffecker and Elias 2007; Holmes 2011; Tamm et al. 2007). What were environmental and climate conditions like in Beringia when people first dispersed there, and specifically, at Owl Ridge during all three subsequent occupation events? Below is a review of late Pleistocene paleoecology of Beringia.

Beringia During the Late Pleistocene

Numerous projects have documented the geographic extent of the Bering Land Bridge, each amending previous reports. Understanding this land feature and its characteristics provides insight into peopling of the Americas studies. Environmentally, Beringia is a conglomeration of varying “cold” environments, some of which may not have been suitable for long-term or any human settlement (Hoffecker and Elias 2007). The conditions in central Alaska were at least tolerable for humans after 14,500 years ago, indicated by the many archaeological sites found (Graf and Bigelow 2011; Potter et al. 2014). As to its accessibility, this depended on sea levels in Beringia and ice sheets in North America. No continental ice sheets were present from Siberia to Alaska during the late Pleistocene (Elias and Brigham-Grette 2007); however, two large ice sheets in Canada (Cordilleran and Laurentide) expanded at times to form a solid mass of ice from the upper reaches of the Mackenzie River in the Northwest Territories south to 38˚N latitude across the United States. Both of these elements were increasing and decreasing at different intervals, making human dispersal across the Bering Land Bridge and migration south into Canada and the United States possible only at specific points in time. When ice sheets were large, sea levels were low so that the land bridge was exposed, yet the coalescence of the Canadian ice sheets blocked dispersal south. We know from paleoecological records that this was the case throughout much of the late Pleistocene until about 13,000 cal BP, when ice sheets melted enough to increase sea levels to the point of submerging the land bridge (Elias et al. 1996) and widening the ice-free corridor in Canada (Mandryk et al. 2001; Munyikwa et al. 2011; Thomas 2002). Between about 26,000 and 21,000 cal BP when glaciation was at its peak (last glacial maximum [LGM]) and sea levels at their lowest point, Siberian and Beringian climate was at its minimum with very cold, arid conditions (Elias and Brigham-Grette 2007; Graf 2014). No archaeological sites have been found from southern Siberia north to Alaska that date to the LGM (Graf 2014). Colonization is believed to have occurred following the LGM and is represented by the oldest archaeological component at the Swan Point site, located in the Tanana valley, central Alaska and dated to about 14,500 cal BP (Holmes 2011).

Central Alaskan Environment in the Late Pleistocene

Prior to humans entering Alaska, the central Alaskan landscape consisted of an herb-tundra, with a corresponding cold and dry climate. By about 14,000 cal BP, temperatures had warmed, and vegetation shifted to a shrub-tundra. Birch populations, especially, thrived in this climate, providing plenty of fuel resources for humans settling in the area (Hoffecker et al. 1993). This climatic shift is known as the Allerød (Graf and Bigelow 2011). Humans at this point were settling in central Alaska, and, with this climate change, they adapted. Resources, such as the birch fuel and fauna such as Dall sheep and wapiti for food, were plenty, providing for a relatively stable environment in which to live (Graf and Bigelow 2011; Hoffecker et al. 1993). Soon came a period of relatively sudden temperature drops and a drier climate, known as the Younger Dryas (YD), as noted in pollen samples from sites in central Alaska (Graf and Bigelow 2011). The YD dates to 12,800-11,700 cal BP (Graf and Bigelow 2011). Herbaceous plant populations increased again with this short-term climatic reversal. Obvious shifts in human behavior, including shifts in technologies, are noted at archaeological sites between components predating the YD and postdating the YD (Owl Ridge, Moose Creek) (Graf and Bigelow 2011). However, to what extent the YD influenced these behavioral changes has yet to be determined. At around 11,000 cal BP, following the cool and dry conditions of the YD, came a warming of temperatures. The Holocene Thermal Maximum (HTM), as this period is referred, witnessed varying degrees of change, at least as the current records depict. With regards to central Alaska, pollen records indicate *Populus* trees expanded across the region (Graf and Bigelow 2011).

Late Pleistocene Archaeology in Central Alaska

Technologically, the Alaskan prehistoric record has proven to be much more complex than originally reported. Within Alaska's archaeological record are various complexes, each with unique characteristics representative of behavioral divergence. This complexity is evident throughout the entire region. In northern Alaska, three lithic complexes are found dating to the Terminal Pleistocene (Smith et al. 2013): the Northern Fluted-Point complex, Sluiceway complex, and Mesa complex. Though certainly bearing some similarity, diagnostic projectile points have distinctive features.

In central Alaska (and most appropriate for the current project) there are two particular archaeological complexes or "techno-complexes" that provide some controversy between Beringian archaeologists, the Nenana and Denali complexes. These two technologies differ in tool usage and time period, the Nenana typically predating the Denali. Who made these technologies and why do such variances exist (Graf and Bigelow 2011)?

Nenana Complex

Originally, the earliest documented people to have settled in central Alaska were believed to be represented by presence of a specific technological assemblage found at several archaeological sites in the Nenana valley, dating to about 13,500-13,000 cal BP (Graf et al. 2015; Graf and Bigelow 2011). Based initially on work at the Dry Creek site, Powers and Hoffecker (1989) coined the term Nenana complex for these Allerød-aged site assemblages. Subsequent findings at other Nenana valley sites such as Owl Ridge (the subject of this thesis), Walker Road, and Moose Creek (Goebel et al. 1991; Graf and Bigelow 2011; Pearson 1999; Phippen 1988) and even at Broken Mammoth in the Tanana valley (Yesner et al. 1992) have further substantiated the presence of the Nenana complex, one that did not look anything like previously reported late Pleistocene archaeological assemblages in central Alaska (Hoffecker et al. 1993). The complex is characterized by small triangular and teardrop shaped bifacial projectile points and unifacial flake tools, often with small end scrapers and gravers (Goebel et al. 1991; Graf and Bigelow 2011; Hoffecker et al. 1993). Nenana complex sites are thought to be part of a logisticallyorganized settlement strategy with both residential base camps located in large river valleys and short-term, seasonal or "spike" camps found in foothill settings and smaller stream valleys (Yesner 2001).

Denali Complex

Sites found in central Alaska before the discoveries in the Nenana valley contained archaeological assemblages dominated by a different type of technology, microblade technology, and were assigned to the Denali complex by West (1967). Denali complex assemblages postdate 13,000 cal BP, mostly dating to the YD (12,800-11,700 cal BP) (Graf and Bigelow 2011). They contain a unique, regional variation on an Upper Paleolithic technology known across Asia (Powers and Hoffecker 1989), including microblades, wedge-shaped microblade cores, and microblade-core technical spalls. The Denali complex also contains lanceolate bifaces, burins, large blades, and bifacial knives (Gore and Graf 2015). A switch from Nenana to Denali complex meant more time was spent on making and maintaining highly specialized composite microblade-osseous projectile technology. Though efficient, it was time intensive. Much debate, however, centers on why this technological transition occurred (Graf and Bigelow 2011; Hoffecker and Elias 2003, 2007). Powers and Hoffecker (1989) initially explained the presence of these two consecutive techno-complexes in central Alaska as the result of two visits to the region by two different groups of people. The Nenana complex represents the initial dispersal from Northeast Asia to Alaska, followed by the Denali complex, a discrete, second migration. However, the discovery of the Swan Point site, located in central Alaska, with a microblade technology present which predates the Nenana complex by 1,000 years (Holmes 2011), greatly complicated the simple succession theory presented earlier.

Some researchers still maintain that shifts from one technology to the other resulted from the influx of new groups of people from Siberia (Hoffecker et al. 1993; Hoffecker and Elias 2007). Some argue the differences in technologies resulted from variations in site function, and therefore, these variants should be considered part of one archaeological tradition, termed the Beringian Tradition (Holmes 2001, 2011; West and West 1996). Others, including our team, argue that climate change, and therefore changes in resource availability, drove these early central Alaskans to adapt and develop different technological strategies to solve the problem of getting food (Graf and Bigelow2011). Simply put, there are three explanations for the archaeological changes we see in central Alaska from before 13,000 cal BP to after this time: (1) two sequential groups left behind two different technologies, (2) the same group left behind different technologies at different sites, and (3) the same group used one technology then changed technologies to adapt to shifting climatic and environmental conditions during the transition from the warmer Allerød interval to the colder YD interval. Archaeologically, the first and third hypotheses will be impossible to untangle without human skeletons and ancient DNA studies. Without ancient DNA we will have a hard time teasing out whether a switch in technologies reflects new people or new ways of behaving. More detailed studies of the archaeological record, however, will help us understand whether or not the second hypothesis is supported or not. If we consistently find archaeological sites without microblade technology dating to the Allerød and Younger Dryas-aged assemblages consistently containing microblade technologies, then we can rule out hypothesis two as a possibility.

Materials: Owl Ridge Site and Its Artifact Assemblages

The Owl Ridge site, the subject of this study, bears unanswered questions, some of which this project will resolve. Results of the current study provide a clearer understanding of the technologies, and associated human behaviors present at the site. They also help us test whether or not the Nenana complex can be separated from the Denali complex chronologically and stratigraphically.

Site Background

Owl Ridge rests on a south-facing bluff in the midst of the Teklanika valley in central Alaska, about 130 kilometers from Fairbanks (Hoffecker et al. 1996). This river is a tributary to the larger Nenana River found to the east (Figure 1). The site was first surveyed in 1976 after its initial discovery by D.C. Plaskett and R. M. Thorson. In 1982 and 1984, P.G. Phippen conducted test excavations at the site expanding upon the previous test-pit work by the initial surveyors (Hoffecker et al. 1996; Phippen 1988). After Phippen's work, the site saw no activity until 2007, when Dr. Kelly Graf of Texas A&M University returned to assess its potential to provide answers to test the above-mentioned hypotheses (Graf and Bigelow 2011).

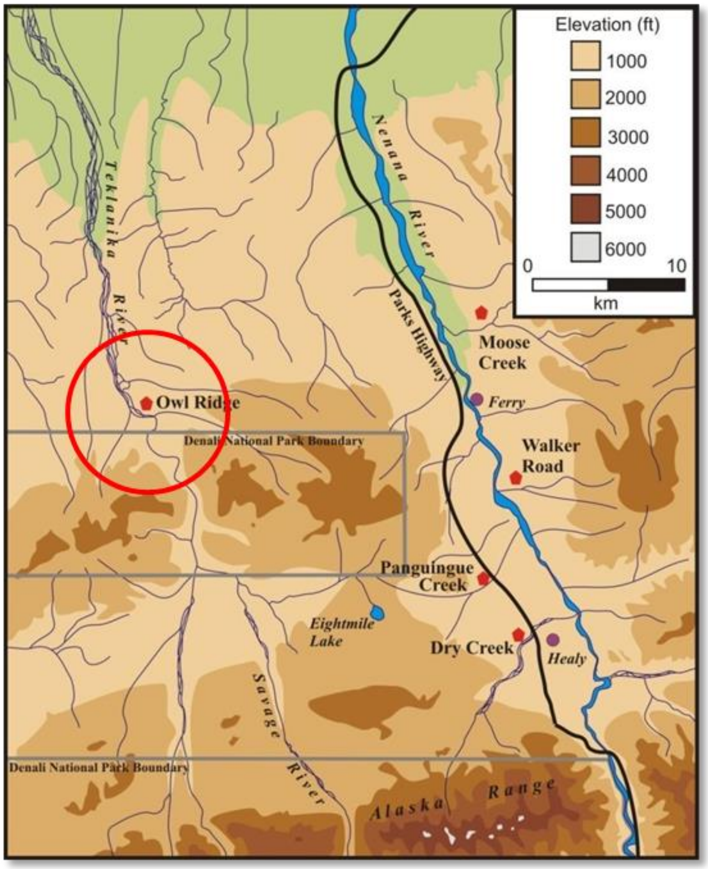

Figure 1 Location of Owl Ridge site

Stratigraphically, the site is composed of eight sedimentological units: stratum 1 is glacial outwash gravel; stratum 2 is a silt containing archaeological component 1; stratum 3 is a course to medium sand; stratum 4 is a silty sand with a paleosol complex and archaeological component 2; stratum 5 is a bedded sand with occasional schist fragments that contains archaeological component 3 artifacts in its upper 3-5 cm; stratum 6 is another silty sand containing forest soils and artifacts from component 3 in its lower 3-5 cm; stratum 7 is a thin silty sand forming the E horizon of the modern soil; and finally, stratum 8 is the O horizon of the modern soil (Phippen 1988). Excavations, conducted by our team, confirmed the stratigraphy reported by Phippen (1988) and resulted in a series of new radiocarbon dates for the stratigraphic units associated with the archaeological components (Figure 2). The dates compiled are from dispersed charcoal samples at the site, with exception of two charcoal samples, found in stratum 5, associated with a hearth feature. Each date was obtained on individual samples of wood charcoal, identified as Salix sp. (willow). Component 1 was found to date to 13,110–12,730 cal BP and component 2 to 12,580–11,310 cal BP (Dates were calibrated using the IntCal13 calibration curve in Calib7.0). Dating component 3 has proven to be complicated due to two sets of varying dates from stratum 5 and stratum 6. Two of the charcoal samples from stratum 5, associated with the hearth feature, date to 11,400-10,710 cal BP; however, stratum 6 has two charcoal samples dating to about 4,800 cal BP (Gore and Graf 2015). Component 3 artifacts, however, straddle the stratigraphic contact between stratum and stratum 6. Whether component 3 is actually two separate components dating to about 11,000 cal BP and 4,800 cal BP or it is a single component straddling the contact of strata 5 and 6, as previously interpreted, was evaluated in this lithic study.

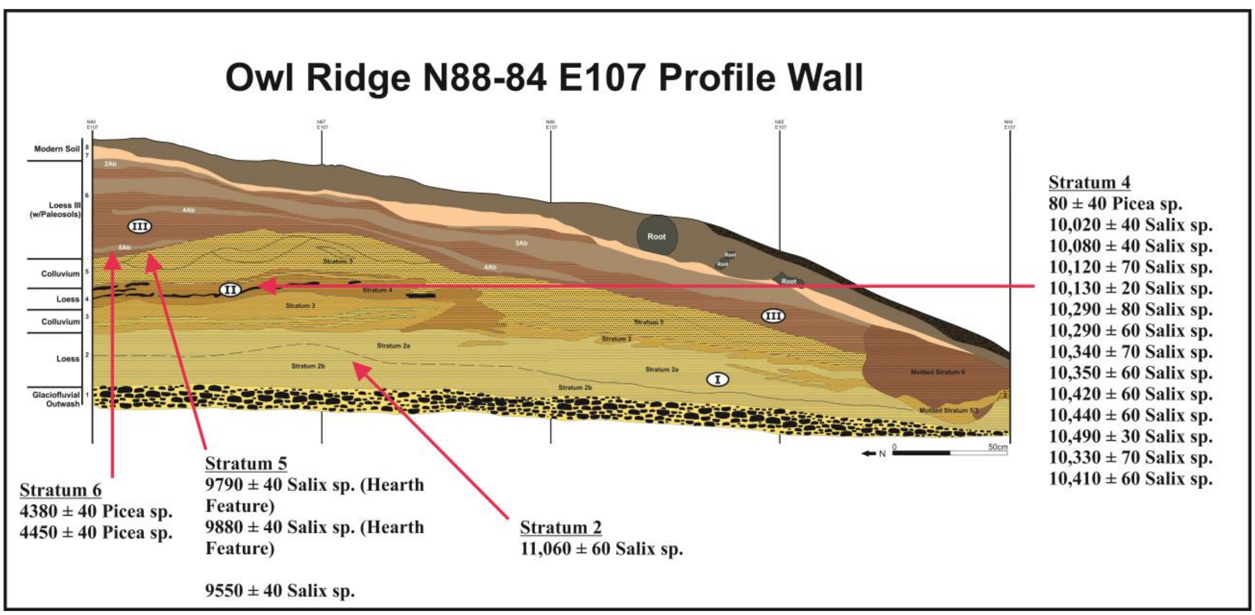

Figure 2 N88-84 E107 Stratigraphic Profile with charcoal sample dates for the sedimentological units.

Lithic assemblages

Within each component, old and new excavations produced lithic assemblages containing the characteristic Nenana and Denali complexes. The component-1 assemblage contains 1,038 artifacts in total, including fragments of four triangular-shaped projectile points diagnostic of the Nenana complex, seven flake tools, and no microblades or microblade cores (Gore and Graf 2015). The component 2 assemblage contains 1,386 artifacts, and component 3 assemblage contains 1,904 artifacts. Both components 1 and 2 contain microblades and lanceolate bifaces, artifacts diagnostic of the Denali complex (Gore and Graf 2015).

Research Objectives

The ultimate goal of this project was to understand site formation at Owl Ridge. My first objective was to determine if all three components and the geological units from which they come are discrete, chronologically and stratigraphically. Radiocarbon dates, diagnostic artifacts, and the stratigraphic placement of the cultural components all support the hypothesis that components 1 and 2 and strata 2 and 4 are indeed discrete. As mentioned above, however, component 3 straddles the strata 5/6 contact so it may actually represent two components, not one. To more completely test for component integrity, I conducted an artifact refit study, seeking refits across the components to establish whether or not they are discrete. If component 1 is separate from components 2 and 3, I expect not to find lithic refits between components 1, 2, and 3. Due to component 3 artifacts being found in two strata (uppermost stratum 5 and lowermost stratum 6), I will attempt to identify the artifacts of component 3 are in fact members of the same component or if they are two separate components. If component 3 is really two separate components, I do not expect to find refits between the artifacts found in stratum 5 and those from stratum 6 artifacts. Refits between the two strata will indicate a single component. My second objective was to determine how many occupation events are represented by the refits in each component. If artifacts refit between artifacts in separate work areas, then the work areas represent a single occupation event. If, however, there are not refits between work areas, then the separate work areas represent separate occupation events. Finally, my third objective was to determine what technological activities were carried out in each occupation event.

CHAPTER II

METHODS

This thesis reports results from a lithic refit analysis, one which utilizes artifacts from three different excavation seasons (2007, 2009, and 2010), all of which were directed by Dr. Kelly Graf of Texas A&M University. Artifact refits were sought out, identifying whether matches occur within and/or between components. Horizontal refits (within component) indicated site activities within that specific occupation. Vertical refits (between components) addressed both site integrity and whether discrete or continuous components existed. A significant number of refits found travelling between components will indicate a lack of integrity. And accordingly, the absence of cross-component refitting supports the previously theorized discrete nature of the site's components. While identifying refits in general, pinpointing any horizontal refits between noted work areas was essential in order to understand the nature of the occupation events within each component. Also, finding sequential refits were key to understanding technological activities transpiring in these work areas.

A Lithic Refit Study

Refits provided the material necessary for evaluating objectives 1 and 2. Refit studies are notorious in archaeology for being difficult and without the promise of substantial results. Developing a strategy requires planning in implementation. The goal in refitting is always to uncover as many matches as possible, though, time limits the number of possible refits to find. Any strategy developed must take into account the time required, allowing for both the efficient usage of time and energy and sufficient garnering of refits. After discussions with my advisor, I came to the conclusion that two strategies would prove to be the most beneficial. Strategy 1 entailed laying artifacts out on a large table in pattern of the site excavation. This allowed me to reconstruct the Owl Ridge site's unit layout in the lab and search for refits both within and between excavation squares. Strategy 2, following the completion of strategy 1, was an auxiliary step to ensure the maximum number of refits found. Artifacts were then grouped by their raw material type and refits sought by raw material to ensure coverage of the assemblage. These two strategies in conjunction worked to maximize the refit count, and they ensured the discovery of trans-stratum refits because in both cases artifacts were not organized stratigraphically. These refit types were identified as each refit was found. Sequential refits are those with artifacts refitting sequentially, with the dorsal and ventral faces of the artifact piecing together. These are interpreted as resulting from tool production. The second refit type was a break. These are refits of broken or fragmented artifacts, be it from technological processes or postdepositional disturbances.

Strategy 1: Refitting by Layout

Strategy 1 required the most amount of time, followed by the less time-consuming strategy 2. With strategy 1, I began my search for refits using a rough site reconstruction in Dr. Graf's research lab. By using a site reconstruction, I was looking for refits in the context of the site itself. This method allowed me to concentrate my efforts looking for refits comprised of artifacts in close proximity to each other, potentially representative of postdepositional breaks while also observing refits traveling across the site horizontally, potentially representative of human behaviors/activities.

All artifacts were taken out of storage and organized by the units in which they were found. Lab trays acted as Owl Ridge's excavation units, with each tray being assigned one to two units, depending on the number of artifacts recovered from the unit. Work space was limited; and therefore, I had to accommodate the trays and artifacts as best as possible, sometimes requiring the sharing of trays for units. All artifacts have their provenience (precise location found during excavation) recorded in the field on artifact tags, allowing for the appropriate placement of each artifact on a tray. I looked for refits within the units first and then compared the artifacts within the unit to the artifacts in the rest of the units from the site. By doing so, I was decreasing the number of artifacts I was working with at a given moment, allowing for a more thorough search while ensuring all possible options were being tested.

Throughout strategy 1, amendments were made to my original plan of implementation, changes which only affected the time required. I originally began by working on only one unit at a time, which required an immense amount of time. I adapted by having multiple (5-6) units out in which I would look for refits, and then compared the other units to them, essentially using an assembly-line process for comparison. A record was made of each refit found, including its provenience (northing, easting, and elevation) and corresponding stratigraphic data (stratum, component), all of which were recorded in the field. Keeping this information at hand was necessary for the coming analysis. As previously mentioned, this strategy was meant to produce the bulk of the refits. Following completion, I implemented strategy 2, acting as a final effort to find additional refits missed with strategy 1.

Strategy 2: Refitting by Raw Material

Following the completion of strategy 1, I then reorganized the artifacts into groups based on raw material. The main raw material types in the Owl Ridge assemblage are black chert, basalt, rhyolite, and andesite. There are several other raw materials found at the site, though in not as great of numbers as these four materials. Additional distinctions were also made within each type. For instance, with the artifacts made of andesite, I realized there were two different sources occurring at the site, one more coarsely grained than the other. The groups that I created are listed as such: black chert, miscellaneous cherts, coarsely-grained andesite, finely-grained andesite, basalt, rhyolite, chalcedony, and miscellaneous raw materials. The screen bags were kept separate due to their containing artifacts of varying raw material types. Each screen bag was reviewed while consulting each raw material group.

By separating by raw material, I created an environment in which all options for a potential refit were present. While before, in the context of the excavation layout, human error may have resulted in the overlooking of an artifact. Becoming absorbed in one raw material type because it was the most common in the unit can occur easily, resulting in missing one made from a less common material. Also, with strategy 2, I focused efforts to identify sequential refits which are likely produced during tool production.

CHAPTER III

RESULTS

Following a thorough search for refits within the Owl Ridge lithic assemblage, occurring over about five months, a total of 119 refits were found. The majority of the refits were found using Strategy 1 (n= 106), while thirteen more were found through strategy 2. All of the refits are illustrated in Figure 3, where the line and dot color indicate the component from which the refits and artifacts come.

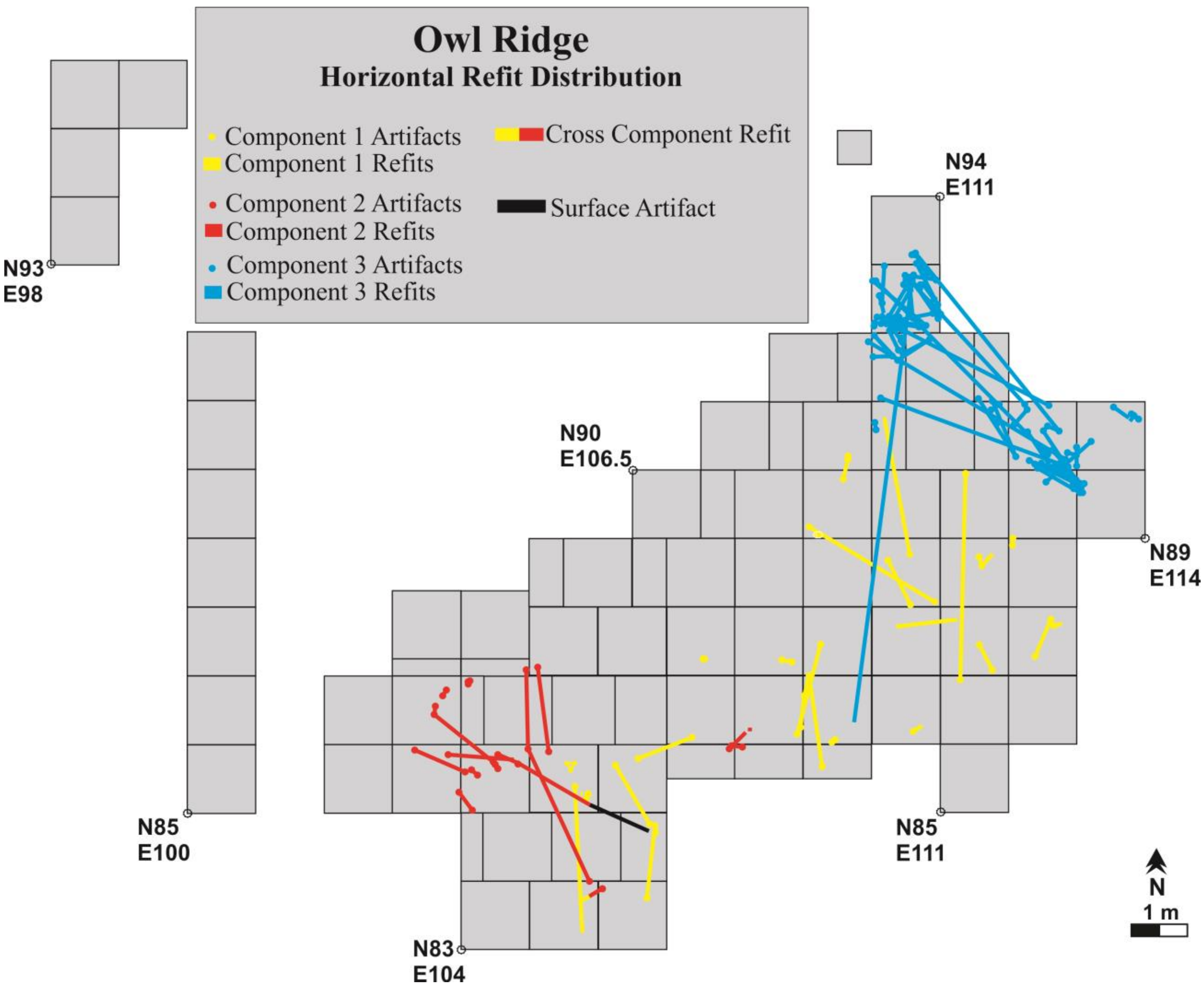

Figure 3 Horizontal distribution of all refits found

Vertical Refit Distribution

From the total of 119 refits, two were found between components (1.68%). The first cross-component refit was found on the terrace edge of the site in extremely compressed strata. The second cross-component refit contained an artifact with surface context. Regarding the nature of component 3, five refits were found to cross the stratigraphic boundary between stratum 5 and stratum 6, as illustrated in Figure 4.

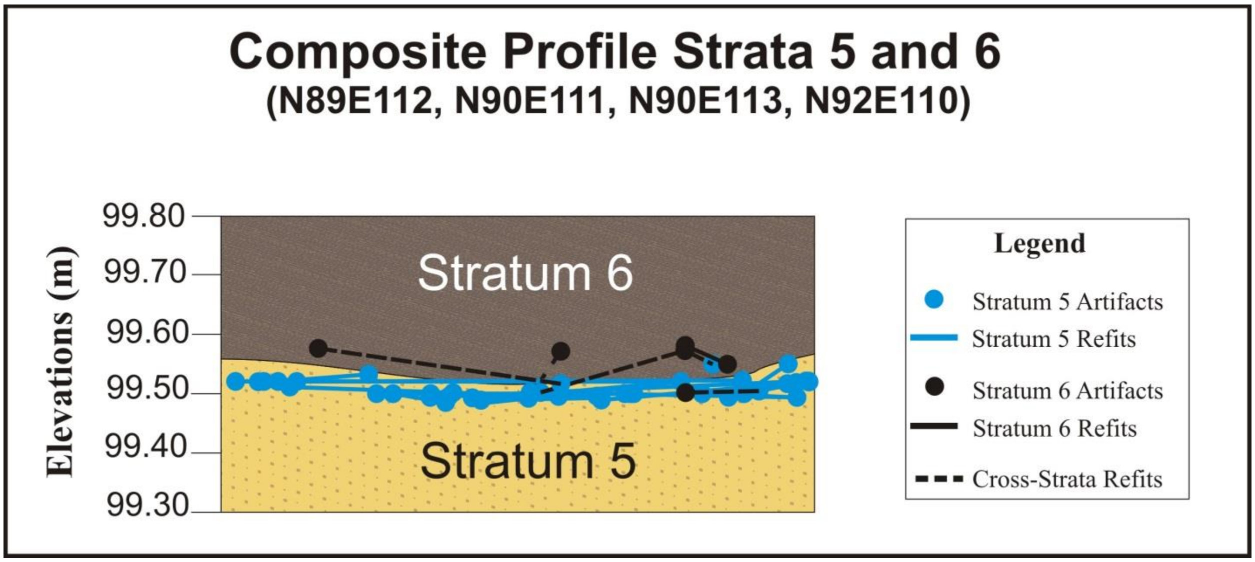

Figure 4 Component 3 cross-strata refits shown within a composite profile

Horizontal Refit Distribution

Within component 1 artifacts, thirty-three refits were found. Horizontal distributions of these refits are shown with the remaining component 1 artifacts in Figure 5. With the refits in the context of the entire lithic assemblage for the component, we can see at least two lithic clusters which appear to have their own discrete refits occurring within each. The refits do not travel between the two clusters. There may even be a third discrete cluster of refits, though further analysis is needed to test this.

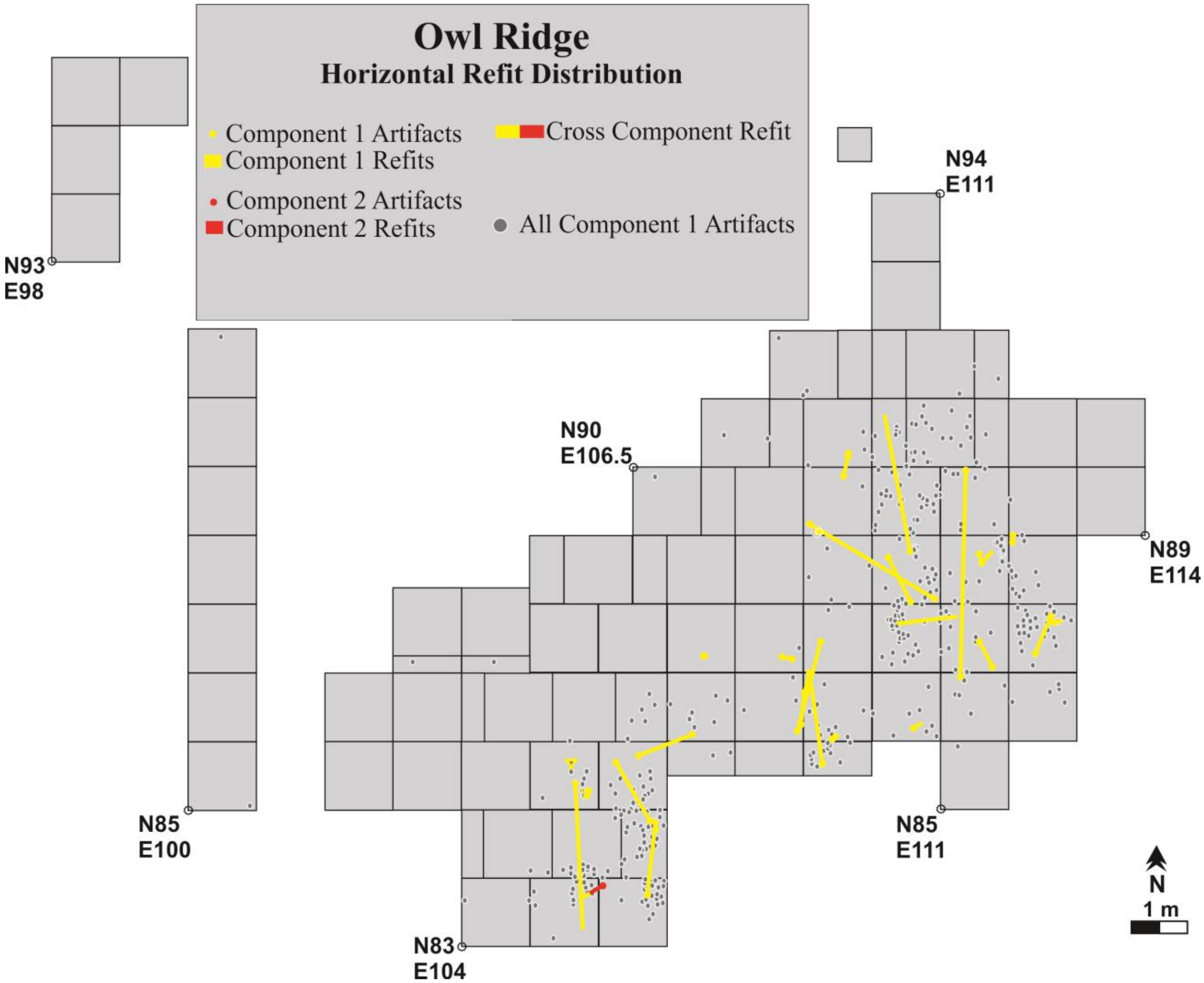

Figure 5 Component 1 artifact and refit distribution

Seventeen refits were found in component 2, as shown in Figure 6. Similarly with component 1, there appeared to be at least two discrete lithic clusters, between which no refits were found to have travelled.

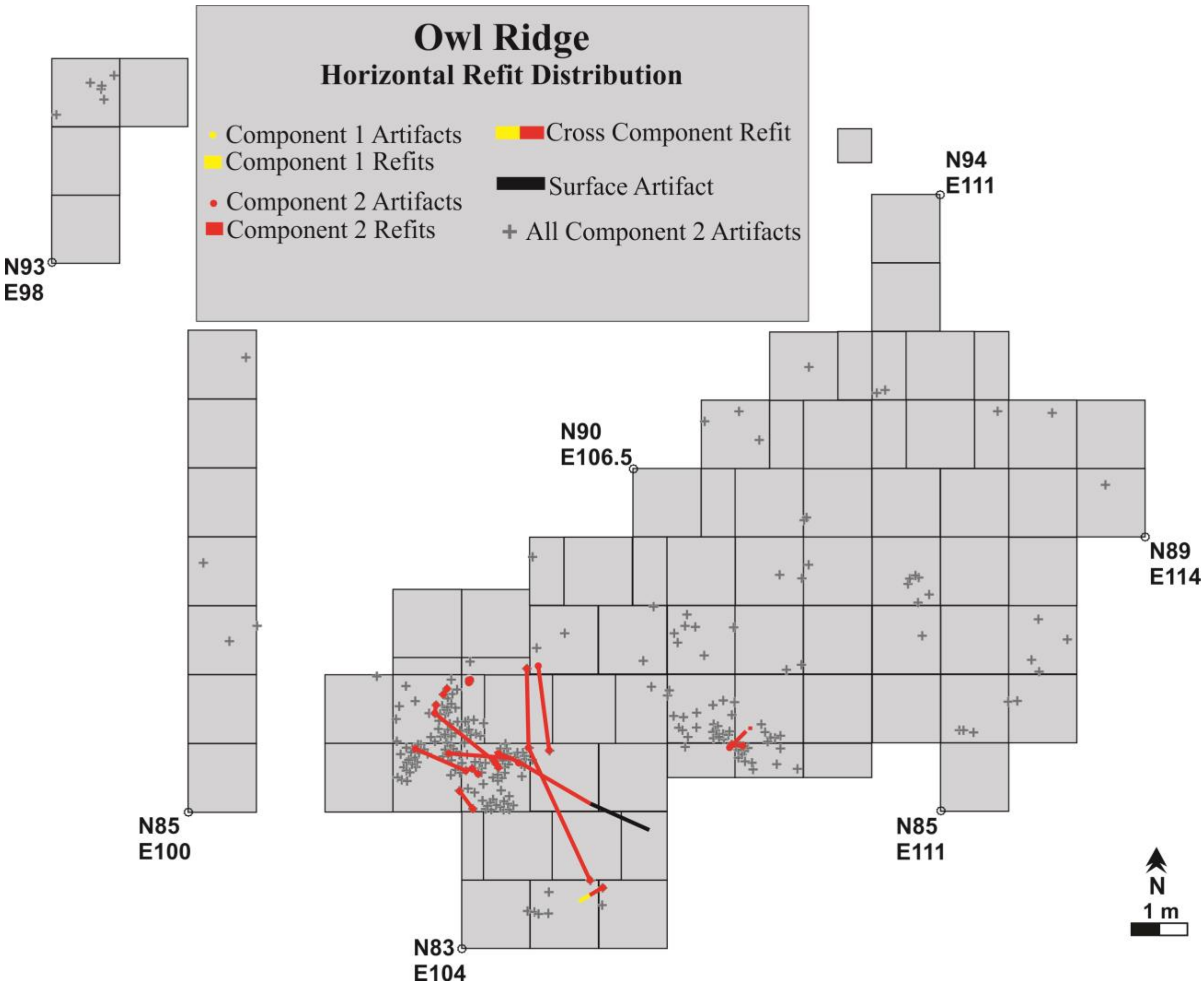

Figure 6 Component 2 artifact and refit distribution

Sixty-nine refits were found in component 3 (Figure 7). Component 3 artifacts were mostly found within two dense lithic clusters in the northeastern corner of the site. Unlike the other components, several artifact refits travelled between the two clusters.

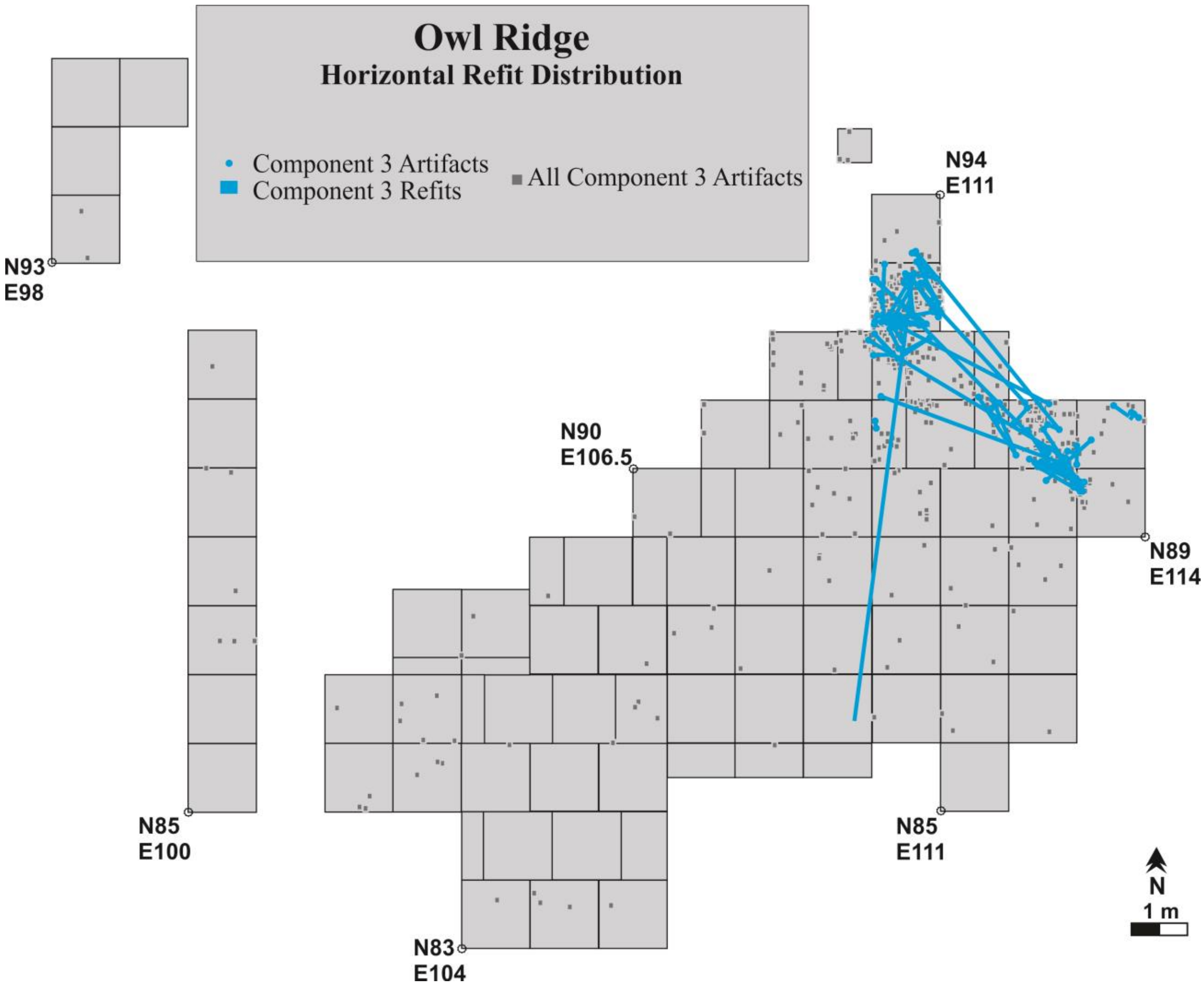

Figure 7 Component 3 artifact and refit distribution

Technological Behaviors at Owl Ridge

When identifying refits, the refit type was also described, be it a sequential refit or a break. Distribution of the break types are shown in Figure 8. I found 28 sequential refits (23.53%) and 92 breaks (77.31%). The number of sequential and break refits per component is shown in Table 1.

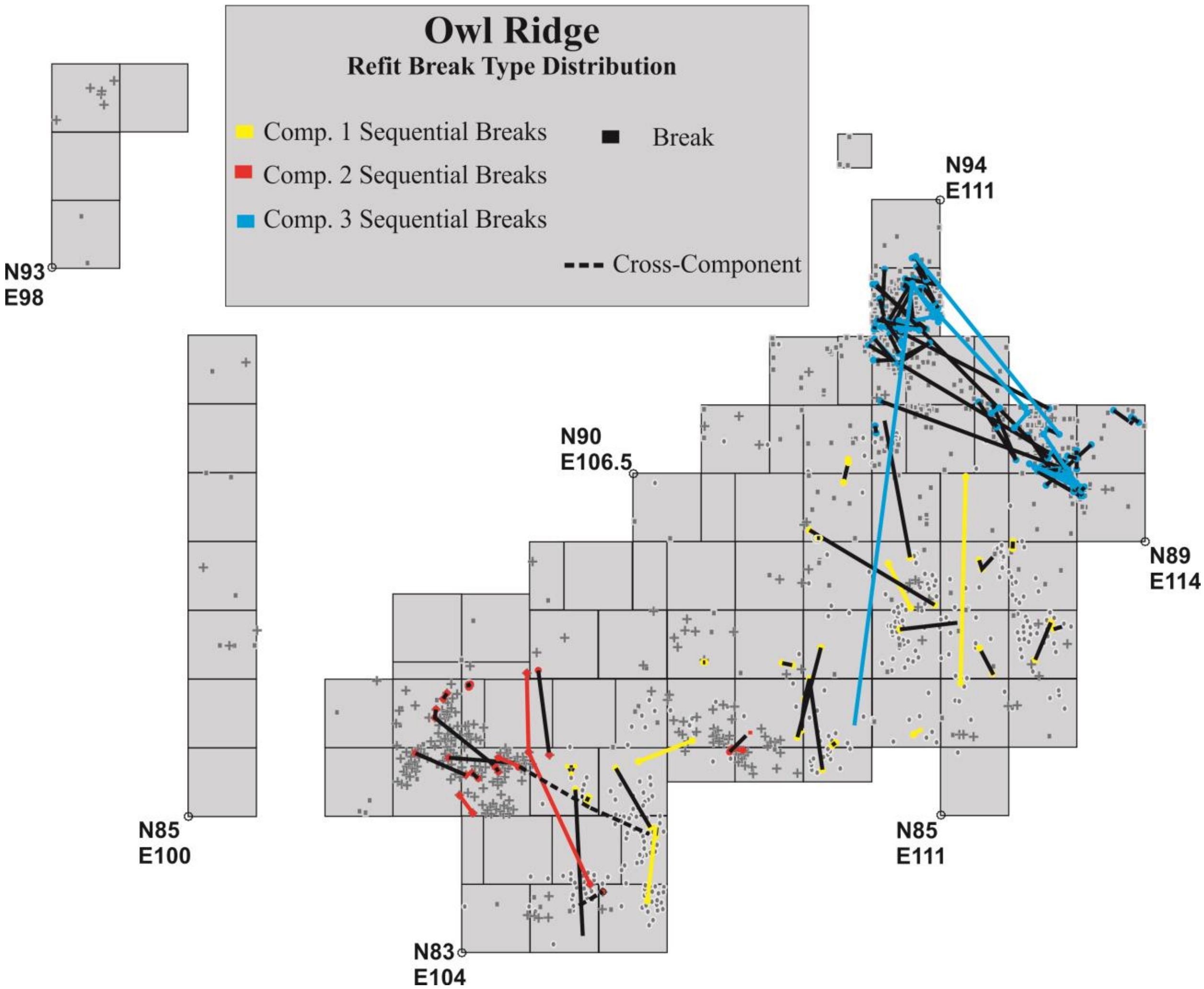

Figure 8 Refit type and artifact distribution

Table 1

Refit Count Per Component	Total	Sequential	Break
Component 1	33	6	27
Component 2	17	6	11
Component 3	69	16	53
Total	119	28	91

CHAPTER IV

DISCUSSION AND CONCLUSIONS

I successfully found 119 refits with this study. Producing a large enough sample size of refits or even any refits can be difficult to ensure when implementing such a study. Several factors can lead to a no-refit result, including transport of artifacts away from the site, no reduction activities occurred at the site, and postdepositional processes disturbed the site, to name a few. Therefore research finding this number greatly enabled us to address our questions.

Component Integrity

Identifying component integrity was the overall goal of this project. However, before addressing the entire site's integrity, we need to first evaluate the nature of component 3, contained within strata 5 and 6. Overall, five component 3 refits were found to cross the stratigraphic boundary between strata 5 and 6. Almost 75% (n=843) of the component 3 assemblage was recovered from the upper sands of stratum 5, with only 25% (n=291) found in the base of stratum 6. These cross-strata refits alone support the interpretation that strata 5 and 6 artifacts are contemporaneous and, together, belong to component 3. Regarding the strata 5 and 6 artifact counts and the charcoal sample from the hearth feature in stratum 5, it would appear that component 3 was occupied during the deposition of stratum 5. This occupation, using the hearth feature charcoal samples, dates to the early Holocene at around 9,800 radiocarbon BP (Gore and Graf 2015). Therefore, the nature of stratum 5 and stratum 6 was evaluated. The previous hypothesis remains evidenced: component 3 is indeed a single component consisting of artifacts from the stratum 5/6 contact.

As mentioned in the results, two refits were found to cross component "boundaries," labeled as inter-component refits. Both refits, however, have extenuating circumstances which do not jeopardize the integrity of the components at Owl Ridge.

The first cross-component refit (UA2010-054-0066 and UA2010-054-0111) was found in the southern-most portion of the site on the terrace edge. One artifact in the pair (UA2010-054-0066) was found in component 1, while UA2010-054-0111 was found in component 2. The units in question, N83E105 and N83E106, lie in highly compressed strata at the edge of the terrace. Likely these artifacts are misplaced due to postdepositional erosion of the slope edge. Therefore, the artifacts in question with this refit were found out of their original context. The artifacts of this refit do not call into question the integrity of components 1 and 2.

The second cross-component refit (UA2010-054-0218 and UA2009-118-0113) was found north of the refit previously discussed, in units N84E106 and N85E104. One artifact (UA2009-118-0113) was found in component 2, and the second artifact (UA2010-054-0218) was found on the site surface where a backdirt pile from the 1980s excavation was placed (Phippen 1988), indicating that it was missed by initial excavators and left on the site surface for us to find 25 years later. Artifact UA2010-054-0218 is a black chert flake fragment. At Owl Ridge, black chert is almost entirely indicative of component 2. Also, these two artifacts refit to a third artifact belonging to component 2. Given these circumstances, these refits do not undermine site integrity.

With this refit analysis, I have established that the three original components are indeed discrete. Component integrity is maintained at the Owl Ridge site.

Occupational Events

Following the establishment of component integrity at the site, I evaluated whether separate occupation events could be interpreted within each component from the refits. To determine such events, I searched for refits between artifact clusters. Refits traveling between two clusters indicate a single occupation, while no refits between the clusters indicate a separate occupation event for each isolated cluster. If, however, two clusters occur with their own discrete refits, we can theorize that those clusters were the product of separate behavioral/occupation events. My results highlighted such events.

As previously discussed, lithic clusters were identified within each component. Within component 1, at least two main lithic clusters, and potentially a third, were observed. These clusters have their own discrete refits occurring within each lithic cluster. Artifacts from one cluster do not travel to refit with others in the other cluster. From this, I conclude these clusters result from at least two separate occupation events within the component (Figure 9).

Within component 2, at least two lithic clusters were observed. Again, I found no refits between these clusters. I conclude that component 2 represents at least two separate occupation events (Figure 9).

Component 3, with a total of 69 refits, has two main lithic clusters in the northeastern portion of the site. These two dense lithic clusters have refits travelling between the two main bodies. One refit is shown travelling to the southern portion of the site, and the artifacts in the areas outside of aforementioned clusters are too sparse in number to associate any specific behavioral activities to them. Due to the refits travelling between the two dense clusters, and between these and the dispersed artifacts, I conclude that component 3 represents a single occupation event (Figure 9).

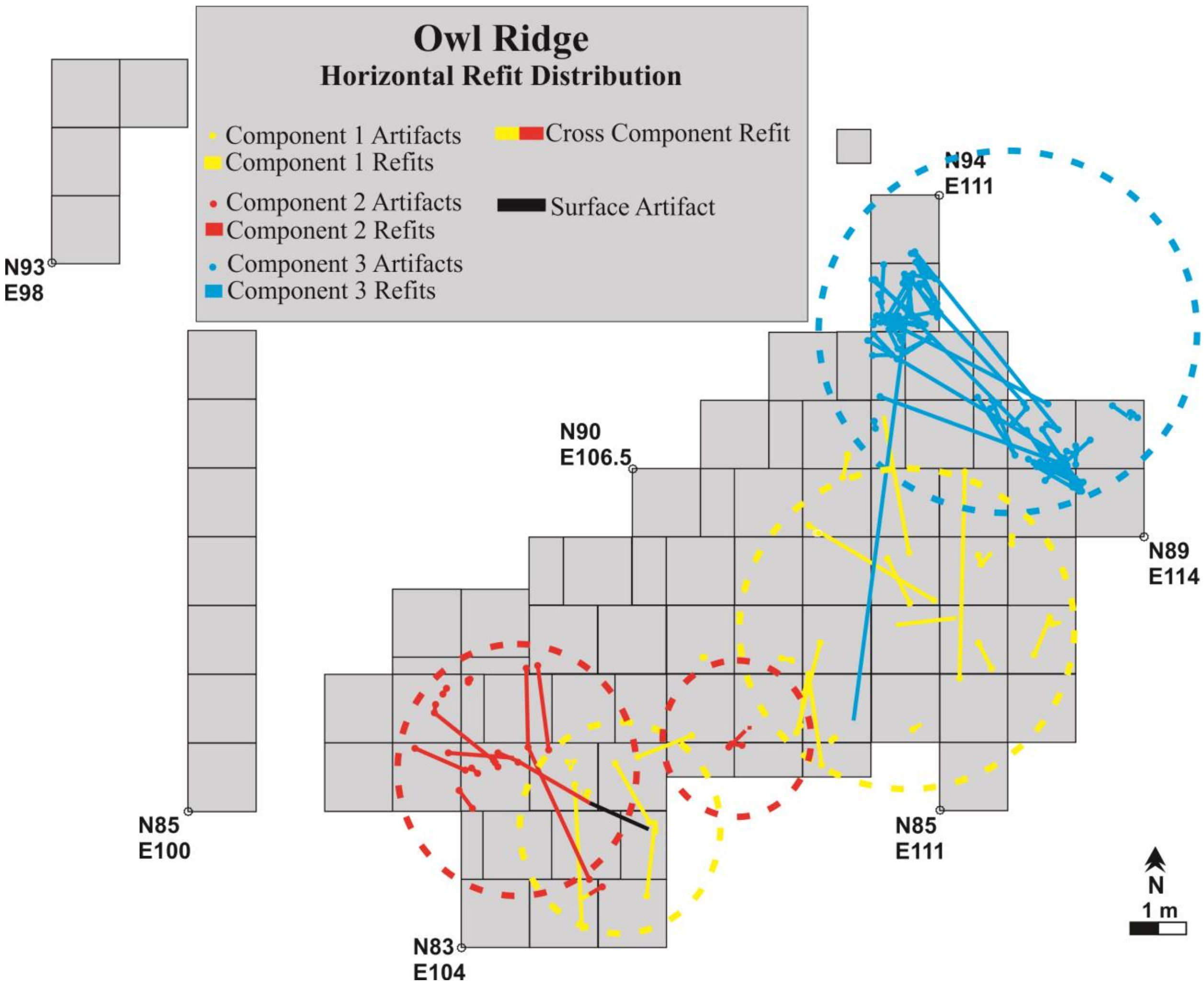

Figure 9 Activity areas noted for each component

Technological Behaviors at Owl Ridge

In these analyses, I hoped to identify behaviors/activities occurring at Owl Ridge, more specifically in relation to the sequential refits within each occupation event activity area. Gore and Graf (2015) found that primary reduction was the most prominent form of reduction occurring at Owl Ridge through time. In my study, I found that primary reduction was the main activity in each of the five occupation events recognized at the site, no matter in which component the occupation event occurred. With regards to secondary reductions, bifacial reduction was the most prominent, again, in all occupation events in all components. The only noticeable variance within the components' occupation events was in the single event within component 3. It appears that a slightly higher percentage of unifacial production occurred within the hearth-feature work area. This higher amount of unifacial production is represented in the archaeological record, where the majority of the artifacts within component 3 are unifacial tools or debitage resulting from unifacial tool production. Perhaps this difference in secondary reduction indicates the site was used repeatedly as a short-term hunting campsite during the components 1 and 2 occupations, whereas it was only used once as a longer-term processing location during the component 3 occupation.

Conclusions

With this lithic refit study, I addressed various depositional and behavioral questions concerning the prehistoric site of Owl Ridge. Following a substantial refit yield produced from the study, my results establish site and component integrity, a minimum number of occupation events for each component, and the technological activities performed during each occupation visit to the site. Once the nature of component 3 artifacts was determined, using charcoal samples found within a cultural context (stratum 5 hearth feature), I established the presence of an early Holocene occupation of the site, which had previously been unidentified. Future analyses will continue to focus on technological activities occurring at the site. With the data found and results from subsequent studies, we will continue to better understand human activities specifically at Owl Ridge and generally prehistoric sites in central Alaska as a whole.

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